C270

CENTRAL FORECASTING TECHNICAL NOTE No.11

User documentation for the frontier program.

P. Sinclair

DEC 1992

METEOROLOGICAL OFFICE.

Central Forecasting Technical Note No.11

User documentation for the Frontier program.

Bracknell::::1992:Pp.i+6:30cm:

93060498

551.509.313.43
681.3.06

Headquarters, Bracknell

FH3A 14 JUN 1993

National Meteorological Library
London Rd, Bracknell, RG12 2SZ

CENTRAL FORECASTING TECHNICAL NOTE NO.11

METEOROLOGICAL OFFICE
C 161215
LIBRARY

User documentation for the Frontier program.

By Philip Sinclair.

Dec 1992

Central Forecasting Division
Meteorological Office
London Road
Bracknell, Berkshire
RG12 2SZ

This paper has not been published. Permission to quote from it should be obtained from the Assistant Director of the above Meteorological Office Division.

CONTENTS

Page

Introduction.....2

Program input.....2

Namelist example 1.....2

Program output.....3

Namelist example 2.....3

Program error control.....3

Program operation.....4

Appendix A - Namelist GETTIME.....4

Appendix B - Namelist GETFIELD.....4

Appendix C - Operational job.....5

Appendix D - Output file specification...6

Introduction

Frontier is a program for extracting fields from the new mesoscale fieldsfile and converting them to the old mesoscale configuration for use by the FRONTIERS software. The extracted field of data is projected on to an equatorial grid with (true) polar coordinates of 0N, 92W and (rotated) zeroth lat / long of 6.59N (interval -0.13), 317.69E (interval 0.13) with 91 x 89 rotated grid points and a 15km grid spacing. This projection is an acceptable approximation to the Old Mesoscale national grid.

Any change in coordinates or size of the input grid will automatically be handled by the fieldsfile access routine FFREAD. To date the input grid is an equatorial grid with a (true) polar projection of 37.5N , 177.5E and (rotated) zeroth lat / long of 8.4N (interval -0.15), 352.8E (interval 0.15) and 92 x 92 grid points with a 16.8km grid spacing.

All the requested fields for a particular forecast time are written to a single output dataset thereby giving as many output datasets as there are distinct forecast times requested.

Program input

The program Frontier is controlled by two namelists,
NAMELIST /GETTIME/ TIME,NFIELDS,FTNUMBER (see appendix A)
NAMELIST /GETFIELD/ LEVEL,TYPE,UNITS,NAME (see appendix B)

&GETTIME
NFIELDS determines the number of entries of (&GETFIELD) which are to be read in for a given forecast TIME and specified FTNUMBER the output unit file connection number.

&GETFIELD
LEVEL and TYPE determine the field to be read in from the fieldsfile,UNITS is used, if required, as a scaling factor for the field values and NAME provides for a field string to be written out to the data set. (&GETFIELD) is repeated NFIELDS times for each (&GETTIME). Hence all requested fields for a given forecast time get written out to the same file connected through the FTNUMBER.

Namelist example 1

```
&GETTIME TIME=0,NFIELDS=2,FTNUMBER=21 &END
&GETFIELD LEVEL=850,TYPE=7,NAME='850MB', &END
&GETFIELD LEVEL=700,TYPE=7,NAME='700MB', &END
```

&GETTIME
(nfields=2) will cause two entries of (&GETFIELD) to be read in with (time=0) and (ftnumber=21).

&GETFIELD
two fields of (type=7) at (level=700 and level=850) are requested with character strings of (name='850mb' and name='700mb')

Program output

As a result of the above namelist input the two fields of 850mb and 700mb DDDFFF are read in with a forecast time of T+0 from the fieldsfile. These fields are processed from the input grid on to the output grid and written, in the same order with which they were requested, to a single file connected to unit 21. The first record of each field is always a header containing the field data time (yymmddhh), a zero, the field validity time (yymmddhh), the field type and level, followed by a name string. The header is written with the FORTRAN format of (9I5,2X,A4,1X,I3,1X,A5,1X,I4,2X,A2,A10), eg

```
1992  11  23  6   0  1992  11  23  6  Type  5  Level  850 'U_850MB
```

This is then followed by the field data which is written to file with the FORTRAN format of (10F8.3). This sequence of header and data is repeated for as many fields as were requested for that forecast time.

When the field type is 7 (DDDFFF) then the field is decomposed and written out to file as X and Y in that order

Namelist example 2

```
&GETTIME TIME=0,NFIELDS=2,FTNUMBER=21 &END
&GETFIELD LEVEL=850,TYPE=7,NAME='850MB', &END
&GETFIELD LEVEL=700,TYPE=7,NAME='700MB', &END
&GETTIME TIME=6,NFIELDS=2,FTNUMBER=22 &END
&GETFIELD LEVEL=850,TYPE=7,NAME='850MB', &END
&GETFIELD LEVEL=700,TYPE=7,NAME='700MB', &END
```

As example 1 but with two forecast times requested, with T+0 fields written to a file connected to unit 21 and T+6 fields written to unit 22.

All field data is in SI units except type 3 (temperature) which is converted to degrees Celsius and type 12 (pressure) to mb. All output grid data has been interpolated from 4 surrounding fieldsfile grid points except for precipitation, cloud base and freezing level which take their values from the nearest grid point.

Program error control

If there is any kind of I/O error either with an incorrect namelist specification or a fieldsfile access then appropriate error messages are written to unit 6. The unobtainable field is tagged as invalid and the whole data set for that invalid field is nullified by writing -9999 nine times to the first record of the data set followed by an end of file marker. This results in all requested fields for that forecast time now being made unavailable. This has been done to allow for the way the FRONTIER software accesses the datasets which makes it unable to cope with missing fields.

Program operation

At present with the operational jobs there are a total of 31 datasets, (COP.MSFRONT.T00/T30) one for each forecast period for use with the FRONTIERS software. At present these data sets are written in from the new mesoscale fieldsfile at the times specified below.

MES 00Z to T+18	Run	Start	Appx.End
	QM00	0235Z	0310Z.Data sets: COP.MSFRONT.T00/T18
MES 06Z to T+30	Run	Start	Appx.End
	QM06	0840Z	0920Z.Data sets: COP.MSFRONT.T00/T30

Operationaly the same data sets are written to by both the 00Z and 06Z runs, each over writing the other. The data set .T00 will contain the T+0 fields, and data set .T01 the T+1 fields and so on. An example of the operational 00Z job is given in appendix C. At present the only operational fields requested on the data sets are those for hourly 850 and 700 mb winds X and Y in that order out to T+30 for the 06Z run and T+18 for the 00Z run.

See appendix D for operational output file specifications.

APPENDIX A

NAMELIST /GETTIME/ TIME,NFIELDS,FTNUMBER

TIME.....An integer specifying forecast time, (T + TIME)

NFIELDS.....An integer specifying the number of (&GETFIELD) entries.

FTNUMBER.....An integer specifying the output file unit connection number.

APPENDIX B

NAMELIST /GETFIELD/ LEVEL,TYPE,UNITS,NAME

LEVEL.....An integer specifying a field level, negative for model levels.

TYPE.....An integer specifying a field type, fieldsfile (FF) type code.

UNITS.....A real value used as a scaling factor for the extracted field where field=field*10**UNITS.Defaults are UNITS=0 (SI units) for all field types except types 3,12 and 18 which have a default of UNITS=2 (printfile units). So UNITS=3 will give a scaling factor of 1000, UNITS=-3, 0.001 etc.

NAME.....A 14 character string to be written in the field header

APPENDIX C

Example of the operational 00Z job for running the Frontier program. Fields requested on the data sets are those for hourly 850 and 700 mb winds X and Y in that order out to T+18.

```
//*    RUN PROGRAM
//CREATE1 EXEC PGM=FRONTIER
//STEPLIB DD DSN=COP.PRODUCT.LOADLIB,DISP=SHR
//*
//*    INPUT CARDLIB
//FT05F001 DD*
 &GETTIME TIME=0,NFIELDS=2,FTNUMBER=21 &END
 &GETFIELD LEVEL=850,TYPE=7,NAME='850MB', &END
 &GETFIELD LEVEL=700,TYPE=7,NAME='700MB', &END
 &GETTIME TIME=1,NFIELDS=2,FTNUMBER=22 &END
 &GETFIELD LEVEL=850,TYPE=7,NAME='850MB', &END
 &GETFIELD LEVEL=700,TYPE=7,NAME='700MB', &END
 &GETTIME TIME=2,NFIELDS=2,FTNUMBER=23 &END
 &GETFIELD LEVEL=850,TYPE=7,NAME='850MB', &END
 &GETFIELD LEVEL=700,TYPE=7,NAME='700MB', &END
 &GETTIME TIME=3,NFIELDS=2,FTNUMBER=24 &END
 &GETFIELD LEVEL=850,TYPE=7,NAME='850MB', &END
 &GETFIELD LEVEL=700,TYPE=7,NAME='700MB', &END
 &GETTIME TIME=4,NFIELDS=2,FTNUMBER=25 &END
 &GETFIELD LEVEL=850,TYPE=7,NAME='850MB', &END
 &GETFIELD LEVEL=700,TYPE=7,NAME='700MB', &END
 &GETTIME TIME=5,NFIELDS=2,FTNUMBER=26 &END
 &GETFIELD LEVEL=850,TYPE=7,NAME='850MB', &END
 &GETFIELD LEVEL=700,TYPE=7,NAME='700MB', &END
 &GETTIME TIME=6,NFIELDS=2,FTNUMBER=27 &END
 &GETFIELD LEVEL=850,TYPE=7,NAME='850MB', &END
 &GETFIELD LEVEL=700,TYPE=7,NAME='700MB', &END
 &GETTIME TIME=7,NFIELDS=2,FTNUMBER=28 &END
 &GETFIELD LEVEL=850,TYPE=7,NAME='850MB', &END
 &GETFIELD LEVEL=700,TYPE=7,NAME='700MB', &END
 &GETTIME TIME=8,NFIELDS=2,FTNUMBER=29 &END
 &GETFIELD LEVEL=850,TYPE=7,NAME='850MB', &END
 &GETFIELD LEVEL=700,TYPE=7,NAME='700MB', &END
 &GETTIME TIME=9,NFIELDS=2,FTNUMBER=30 &END
 &GETFIELD LEVEL=850,TYPE=7,NAME='850MB', &END
 &GETFIELD LEVEL=700,TYPE=7,NAME='700MB', &END
 &GETTIME TIME=10,NFIELDS=2,FTNUMBER=31 &END
 &GETFIELD LEVEL=850,TYPE=7,NAME='850MB', &END
 &GETFIELD LEVEL=700,TYPE=7,NAME='700MB', &END
 &GETTIME TIME=11,NFIELDS=2,FTNUMBER=32 &END
 &GETFIELD LEVEL=850,TYPE=7,NAME='850MB', &END
 &GETFIELD LEVEL=700,TYPE=7,NAME='700MB', &END
 &GETTIME TIME=12,NFIELDS=2,FTNUMBER=33 &END
 &GETFIELD LEVEL=850,TYPE=7,NAME='850MB', &END
 &GETFIELD LEVEL=700,TYPE=7,NAME='700MB', &END
 &GETTIME TIME=13,NFIELDS=2,FTNUMBER=34 &END
 &GETFIELD LEVEL=850,TYPE=7,NAME='850MB', &END
 &GETFIELD LEVEL=700,TYPE=7,NAME='700MB', &END
 &GETTIME TIME=14,NFIELDS=2,FTNUMBER=35 &END
 &GETFIELD LEVEL=850,TYPE=7,NAME='850MB', &END
 &GETFIELD LEVEL=700,TYPE=7,NAME='700MB', &END
 &GETTIME TIME=15,NFIELDS=2,FTNUMBER=36 &END
 &GETFIELD LEVEL=850,TYPE=7,NAME='850MB', &END
```

```
 &GETFIELD LEVEL=700,TYPE=7,NAME='700MB', &END
 &GETTIME TIME=16,NFIELDS=2,FTNUMBER=37 &END
 &GETFIELD LEVEL=850,TYPE=7,NAME='850MB', &END
 &GETFIELD LEVEL=700,TYPE=7,NAME='700MB', &END
 &GETTIME TIME=17,NFIELDS=2,FTNUMBER=38 &END
 &GETFIELD LEVEL=850,TYPE=7,NAME='850MB', &END
 &GETFIELD LEVEL=700,TYPE=7,NAME='700MB', &END
 &GETTIME TIME=18,NFIELDS=2,FTNUMBER=39 &END
 &GETFIELD LEVEL=850,TYPE=7,NAME='850MB', &END
 &GETFIELD LEVEL=700,TYPE=7,NAME='700MB', &END
/*
//FT06F001 DD SYSOUT=*
//*
//*    OUTPUT DATA SETS
//FT21F001 DD DSN=COP.MSFRONT.T00,DISP=(OLD,KEEP)
//FT22F001 DD DSN=COP.MSFRONT.T01,DISP=(OLD,KEEP)
//FT23F001 DD DSN=COP.MSFRONT.T02,DISP=(OLD,KEEP)
//FT24F001 DD DSN=COP.MSFRONT.T03,DISP=(OLD,KEEP)
//FT25F001 DD DSN=COP.MSFRONT.T04,DISP=(OLD,KEEP)
//FT26F001 DD DSN=COP.MSFRONT.T05,DISP=(OLD,KEEP)
//FT27F001 DD DSN=COP.MSFRONT.T06,DISP=(OLD,KEEP)
//FT28F001 DD DSN=COP.MSFRONT.T07,DISP=(OLD,KEEP)
//FT29F001 DD DSN=COP.MSFRONT.T08,DISP=(OLD,KEEP)
//FT30F001 DD DSN=COP.MSFRONT.T09,DISP=(OLD,KEEP)
//FT31F001 DD DSN=COP.MSFRONT.T10,DISP=(OLD,KEEP)
//FT32F001 DD DSN=COP.MSFRONT.T11,DISP=(OLD,KEEP)
//FT33F001 DD DSN=COP.MSFRONT.T12,DISP=(OLD,KEEP)
//FT34F001 DD DSN=COP.MSFRONT.T13,DISP=(OLD,KEEP)
//FT35F001 DD DSN=COP.MSFRONT.T14,DISP=(OLD,KEEP)
//FT36F001 DD DSN=COP.MSFRONT.T15,DISP=(OLD,KEEP)
//FT37F001 DD DSN=COP.MSFRONT.T16,DISP=(OLD,KEEP)
//FT38F001 DD DSN=COP.MSFRONT.T17,DISP=(OLD,KEEP)
//FT39F001 DD DSN=COP.MSFRONT.T18,DISP=(OLD,KEEP)
//*
//*    INPUT FIELDS FILE
//FT54F001 DD DSN=COP.FFMSA,DISP=SHR,LABEL=(,,,IN)
```

APPENDIX D

Output file specification

Organisation	PS	Record format	FB
Record length	80	Block Size	4800